Synetic Inc.

A New Approach to Data Storage Management

SyneRAID6™-SATA-II RAID Subsystems SCSI/Fibre-to-SATA-II

SyneRAID6™-8SSA/F4SA **2U Rack w/Dual Channel Clustering** **SCSI or 4GFibre to 8 x SATA-II drives**	**SyneRAID6™-12SSA/F4SA** **2U Rack w/Dual Channel Clustering** **SCSI or 4GFibre to 12 x SATA-II drives**	**SyneRAID6™-16SSA/F4SA** **3U Rack w/Dual Channel Clustering** **SCSI or 4GFibre to 16 x SATA-II drives**

Model	***SyneRAID6™ SCSI/U320-to-SATA-II RAID Subsystems*** ***All SCSI units include:* 2xpower cords, 1xnull modem cable, 1x3ft SCSI cable, 1xLVD terminator, embedded remote GUI RAID management software, free spare fan and tray.**
SyneRAID6-8SSA (2URack)	**U4WSCSI/320MBs-to-SATA-II/300Gbps (Dual Channel Clustering):** 2U 19" Rackmount RAID subsystem with Intel IOP321 64bit/400MHZ processor controller, RAID 0, 1, 0+1, 3, 5, 6 & JBOD, 512MB DDR ECC Cache memory, 10/100 Ethernet port, 8x hot swappable disk canister, hot swappable load sharing redundant power supply.
SyneRAID6-12SSA (2URack)	**U4WSCSI/320MBs-to-SATA-II/300Gbps (Dual Channel Clustering):** 2U 19" Rackmount RAID subsystem with Intel IOP321 64bit/400MHZ processor controller, RAID 0, 1, 0+1, 3, 5, 6 & JBOD, 256MB DDR Cache memory, 10/100 Ethernet port, 12x hot swappable disk canister, hot swappable load sharing redundant power supply.
SyneRAID6-16SSA (3URack)	**U4WSCSI/320MBs-to-SATA-II/300Gbps (Dual Channel Clustering):** 3U 19" Rackmount RAID subsystem with Intel IOP321 64bit/400MHZ processor controller, RAID 0, 1, 0+1, 3, 5, 6 & JBOD, 256MB DDR Cache memory, 10/100 Ethernet port, 16x hot swappable disk canister, hot swappable load sharing redundant power supply.
Model	***SyneRAID6™ Fibre/4Gb-to-SATA-II RAID Subsystems*** ***All Fibre units include:* 2x power cords, 1xnull modem, 2xFibre SFP (Copper or Optical LC) and embedded remote GUI RAID management software and free spare fan and tary.** **Fibre cables must be purchased separately**
SyneRAID6-8F4SA (2URack)	**FC/4Gbit-to-SATA-II/300Gbps (Dual FC Channel Clustering):** 2U 19" Rackmount RAID subsystem with Intel IOP321 64bit/400MHZ processor controller, RAID 0, 1, 0+1, 3, 5, 6 & JBOD, 256MB DDR Cache memory, 10/100 Ethernet port, 8x hot swappable disk canister, hot swappable load sharing redundant power supply.
SyneRAID6-12F4SA (2URack)	**FC/4Gbit-to-SATA-II/300Gbps (Dual FC Channel Clustering):** 2U 19" Rackmount RAID subsystem with Intel IOP321 64bit/400MHZ processor controller, RAID 0, 1, 0+1, 3, 5, 6 & JBOD, 256MB DDR Cache memory, 10/100 Ethernet port, 12x hot swappable disk canister, hot swappable load sharing redundant power supply.
SyneRAID6-16F4SA (3U Rack)	**FC/4Gbit-to-SATA-II/300Gbps (Dual FC Channel Clustering): 3**U 19" Rackmount RAID subsystem with Intel IOP321 64bit/400MHZ processor controller, RAID 0,1, 3, 5, 6, 30, 50&JBOD, 256MB DDR Cache memory, 10/100 Ethernet port, 16x hot swappable disk canister, hot swappable load sharing redundant power supply.
SLD-RAL-12SATA-xU	18"-to-30" Expandable Sliding RAID for SyneRAID6-SATA 2U/3U Rack
Battery-Backup Module (BBM)	BBU (Battery Backup Module) with 68-72 hours for high power chip cache modules and 111-120 hours for low power cache module.
PSM-375W-SR6	375W Power Supply Module for SyneRAID6 8/12-Bay
PSM-460W-SR6	460W Power Supply Module for SyneRAID6 16-Bay

SyneRAID6™-SATA-II series are standard 19" Rackmount 8/12/16 Bay SCSI/4GFibre-to-SATA-II RAID subsystems with low profile, ultra condensed, totally modular and cable-less design with various data storage applications for fast-growing SAN and NAS environments. These units offer incredible cost-effective data storage solution for clients ranging from small business to departmental and enterprise level.

SyneRAID6™-SATA-II series are high performance, incredibility reliable, considerably available with scalability to greater capacity in a cost-effective manner. They utilize the new generation of Serial ATA-I/II channels for disk drives and offer two different types of host interface, Ultra320 SCSI or 4Gbps Fibre Channel as DAS (Direct Attached Storage).

When properly configured and implemented, they can provide non-stop data access with a high degree level of fault-tolerance utilizing RAID technology and advanced array management features.

SyneRAID6™-SATA-II series offer 8/12/16 SATA drives bay with two Ultra320 SCSI host interface, in 2U or 3U height 19" Rackmount chassis.

The RAID controller is equipped with a high performance Intel **IOP80321 Xscale** processor with embedded 32KB data cache, 32KB instruction cache and 2KB mini-data cache and 1GB DDR ECC operational cache memory. These units benefit from the advance algorithms to provide RAID level 0, 1, 3, 5, 0+1, JBOD and **RAID6** to provide higher degree of data protection, parity redundancy and consequently higher availability.

SyneRAID6™-SATA-II series can offer a performance up with utilization of new generation of Serial ATA-II drives. Terabytes of data bank can be built with less compatibility problems. With redundant and hot-swappable power supplies and cooling system, components failure do not effect and interrupt the data access and availability.

SyneRAID6™-SATA-II series also offer Web-base GUI embedded management and configurations utilities via on-board Ethernet port providing a convenient way to configure and monitor the RAID subsystem locally and remotely. The SNMP feature also create additional alerting in larger network through local LAN or over IP.

<< Firmware Features >>

1)- 64bit LBA Mode Support for Single Large Capacity:
SyneRAID6™-SATA-II are now capable to address 64bit LBA disk access via a single SCSI or Fibre ID number assigned to a single LUN for the whole unit capacity.

Depending on the OS, theoretically MS-Windows 2000, 2003, XP are capable of offering 16TB in single drive letter (for more info **Please Read Microsoft >2TB LUN**). Linux and most of the other 64bit OS can offer 512TB for a single drive letter. However, for example in order to address 5.6TB **(16x400GB SATA with RAID5+Spare),** traditionally we had no choice but to break it down to less than 2TB LUNs or partitions.

With the new 64bit LBA firmware installed in ***SyneRAID6™-SATA-II*****,** a 64bit OS (**32bit OS may work with some setup changes)** can

see the entire capacity under a single drive letter, can format the disk and run application without volume striping/spanning or any additional consolidation software. This ultimately means better consolidation and more manageability.

2)- NCQ (Native Command Queuing) Support for SATA-I/II:
NCQ is a powerful feature originally designed for SATA-I/II disks to increase performance and endurance by allowing the drive to internally optimize the execution order of workloads.

Intelligent re-ordering of commands within the drive's internal command queue helps to improve performance of queued workloads by minimizing mechanical positioning latencies on the drive.

SyneRAID6™-SATA-II new firmware offers full compliant for both SATA-I/150MBs and SATA-II/300MBs not just at the firmware level but at the disk interface level as well via dedicated individual SATA-II chip for each drive. With this, the STR (Sustained Transfer Rate) can rich above 220MBs using SCSI and up to 280MBs using Fibre.

3)- Auto-Speed Setting with NCQ and SATA Max Mode Support:
SyneRAID6™-SATA-II offers four different mode for SATA drives speed settings (**SATA 150, SATA 150+NCQ, SATA 300, SATA 300+ NCQ**). This new feature allows the setting for at SATA300+NCQ if supported and if not the system will automatically find the next suitable speed for your hardware. This function works very similar to the SCSI bus connection between the host and the Raid unit. Here is an example when **Host HBA=U3 160 and Raid Volume=U4 320.**

Since the host interface does not support U4 therefore Raid will automatically down mode to U3 160 to connect with the host HBA. In a real situation when a client sets the Max SATA mode to be SATA300+NCQ but this particular client's hardware only support SATA150 +NCQ then the controller will automatically down mode to SATA150+NCQ to fit the needs of client's hardware.

4)- Display Events in Single Page:
In the past firmware versions, the event logs are stored in 4 pages. This new version combines all 4 pages in one, so you can just save them as one HTML file for future reference. This will help to view multiple page in a glance and assist better problem tracking and diagnostic.

5)- TLER function (Time Limited Error Recovery), Timeout and Retry setting:
SyneRAID6™-SATA-II TLER functions provide support for WD Caviar RE (RAID) series disks. This is a new option from WD to support RAID features that were traditionally missing from standard desktop drives. Please refer to the follow links for more information about **WD-TLER (Time Limited Error Recovery)**.

- **Default is 7 seconds**: You can select between 3~8 second. This feature is to setup the HDD timeout volume.
- **Retry setting:** There are two selections, either 2 retry or 3 retry.

6)- Buffer Threshold setting:
Under this new feature there are 3 options; 25%, 50%, 75%. The percentage represents how much data should be kept in resident cache (how full cache should get) before controller starts writing data onto the hard drives. If the buffer is set for 25%, then all 25% will be cached and is used for writing data. The remaining cache will be used for reading and other system overhead.

This feature gives controller extra buffer time in case of slow response from the hard drives within a given time. Consequently, this can prevent a pause in data flow and there will be continuos data access and stream. This feature is very useful for the video streaming applications where there is high demand for constant non-stop data flow with no interruption due to lower performance of specific hardware.

7)- Battery Backup Monitoring and SNMP Warning:
This feature will offer a proprietary MIB for SNMP trap to monitor the cache battery backup status. The existing firmware only shows as whether the cache battery is full, half, empty or completely failed. It does not provide SNMP notifications in case of battery failure or low battery level. The upcoming firmware will add this feature allowing the SNMP servers across a network to pickup the battery status via SNMP signals and broadcast a notification email or fax over the network to the IT staff in charge.

Summary of Technical Specifications

RAID Architecture:
Intel **IOP80321** Xscale 64-bit I/O processor with embedded 32KB data cache, 32KB instruction cache and 2KB mini-data cache.
Proprietary ASIC to support extreme performance RAID6 function
Up to 1GB 200MHz DDR SDRAM operational memory in one DIMM socket with ECC support
Advance 100Mhz/64-bit PCI-X bus architecture
Marvell 8 channels SATA-II 3Gbps controller **88SX60xx (PDF)**
RAID Features:
RAID Levels: 0, 1, 0+1, 3, 5, **RAID6** & JBOD withMultiple Array selection
Online RAID level/stripe size migration
Online Array Roaming (mix match drives in any order)
Online capacity expansion and RAID level migration simultaneously
Instant availability and background initialization and Snap-Shot
Automatic drive insertion / removal detection and rebuilding
Host Interface:
• Two Clustering Ultra320 SCSI Channels - 320MB/sec per channel • Two Clustering SAN Ready 4Gb Fibre Channel with Copper HSSDC2 or Optical LC SFP

Drive Interface:	
8, 12 or 16 SATA-I/150MBs or SATA-II/300MBs w/NCQ per channel	
Monitoring & Indicators:	
LCD Control Panel for setup, alarm mute and configuration	
System status indication through LCD, LED and alarm buzzer	
All system events can be sent to multiple user alerts to be via "Plain English" e-mails	
SNMP alerting and event report systems compatible with most of SNMP management systems	
RAID Management:	
Field-upgradeable firmware in flash ROM	
Firmware-embedded SMTP manager allows monitoring of all system events. User can select either single or multiple user alerts to be sent via "Plain English" emails	
Firmware-embedded Web Browser-based RAID manager via 10/100 Ethernet port	
Operating Systems:	
Hardware and OS independent, transparent to the host, tested with most popular OS such as; MS-Windows all versions, Linux all versions, Sun Solaris 8/9, as well as Novell NetWare, FreeBSD, Unix different versions	
Environmental /Physical	
Cooling System:	Hot swappable and Redundant Cooling Fan modules
Power System:	Redundant by Dual 460W Power modules with PFC feature, Load Sharing type and cable less design
Battery Backup (Optional):	BBU (Battery Backup Unit) with 68-72 hours for high power chip cache modules and 111-120 hours for low power cache module.
Electrical:	AC Voltage 110-230 VAC /AC Frequency 50-60Hz
Temperature:	Operating Temperature: 10 to 35 degree C
Relative Humidity:	20% to 80% non-condensing
Dimensions:	446mm(W) x 470mm(D) x 3U
Weight:	18KGS